CONSTRUCTION SPECIFICATIONS
LANDFILL CONSOLIDATION AND
FINAL COVER CONSTRUCTION

3200 WEST 6200 SOUTH
TAYLORSVILLE, UTAH

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PART 1 - GENERAL

1.1 RELATED SECTIONS

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1.2 BACKGROUND

A. These Construction Specifications are for the waste consolidation and closure of a former landfill located on Utah Department of Transportation (UDOT) property in the vicinity of 6200 South and 3200 West in Taylorsville, Utah. This document will refer to the site owner, UDOT as "Department".

B. The current landfill consists of approximately 30 acres of land that was closed to active land filling in approximately 1978. As part of a plan to redevelop a larger parcel of property that includes the former landfill, UDOT has requested that the existing landfill material be consolidated to reduce the landfill footprint prior to the transfer of the property. After consolidation of material, a landfill cap will be installed as outlined in the Plans and these Specifications.

C. Kleinfelder, Inc. of Salt Lake City will perform the project construction quality assurance. Kleinfelder personnel are referred to in this document as the "engineer" and/or "site inspector". The project construction contractor is referred to as "contractor".

1.3 INTENT OF CONTRACT

A. Complete all work and furnish all resources and other incidentals required to complete the specified work.

1.4 SCOPE OF WORK AND SEQUENCE

A. This document presents Specifications applicable to the scope of work. The general sequence of work is presented below.
   - Prepare a Utah Pollution Discharge Elimination System (UPDES) Permit (which includes development of a Storm Water Pollution Prevention Plan or SWPPP), and develop a Fugitive Dust Control Plan, Odor Control Plan (as needed) and a Site Health and Safety Plan. All plans to be reviewed and approved by Engineer. (See Section 01560- Environmental Controls.)
   - Provide site security as deemed appropriate by contractor to control site access (Section 00727- Control of Work).
   - Perform site surveys as necessary to properly construct the finished landfill cell in accordance with these plans and specifications (Section 01721- Survey).
   - Construct haul roads, drainage structures, and other miscellaneous work such as installation of litter fencing (Section 02370- Erosion Control). Excavate and relocate existing municipal solid waste, construction debris, overburden material and natural soils to the specified grades and depth (Section 02100- Excavation and Placement of Waste).
   - Install passive landfill-gas vent wells within landfill cell prior to installation of final cover (Section 02025- Passive Methane Vent).
   - Install the final landfill cover, including a Geosynthetic Clay Liner (GCL), on top of the relocated material (Sections 02300 and 02340, Final Cover and Geosynthetic Clay Liner).
   - Construct permanent stormwater drainage control features such as open drainage ditches and a stormwater detention basin (Section 02630- Stormwater Drainage Structures).
   - Measurement for work performed shall be calculated as described Section 01280- Measurement.
   - Revegetation of the final cover is not included in this scope of work and will be performed by Department upon project completion.

1.5 DIFFERING SITE CONDITIONS

A. During the progress of the work, if subsurface or latent physical conditions are encountered at the site, promptly notify the Engineer in writing of the specific differing conditions before the site is disturbed and before the affected work is performed.

B. Upon written notification, the Engineer:
- Investigates the conditions within 24 hours.
- Determines if the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the Contract.
- Notifies the Contractor whether or not an adjustment of the Contract is warranted. If warranted, modify the Contract in Writing accordingly.

1.6 SIGNIFICANT CHANGES IN THE CHARACTER OF WORK

A. The Engineer reserves the right, at any time during the work, to make written changes in quantities and alterations in the work that are necessary to satisfactorily complete the project. Such changes in quantities and alterations do not invalidate the Contract or release the surety, and the Contractor agrees to perform the work as altered.

B. If significant changes are made, the Contract will be adjusted to reflect the changes. The Department initiates and the Contractor agrees to the basis for the adjustment before the performance of the work.

1.7 SUSPENSIONS OF WORK ORDERED BY THE ENGINEER

A. If the Engineer suspends or delays in writing the performance of all or any portion of the work for an unreasonable period of time (not originally anticipated, customary, or inherent to the construction industry), and the Contractor believes that additional compensation or contract time or both are due as a result of such suspension or delay, submit to the Engineer a written request for adjustment within 7 calendar days of receipt of the notice to resume work. Explain the reason for the request and provide support for such an adjustment.

B. Upon receipt of request, the Engineer:
- Evaluates the request within 5 working days.
- Adjusts (excluding profit) and modifies the Contract in writing accordingly, if the Engineer agrees that:
  - The suspension increased the cost and/or time required for the performance of the Contract.
  - The suspension was caused by conditions beyond the control of and not the fault of the Contractor, its suppliers, or subcontractors at any approved tier.
  - The suspension was not caused by weather.
- The Engineer notifies the Contractor of whether or not an adjustment of the Contract is warranted.
  - Department pays under the provisions of Section 01282, article, "Differing Site Conditions, Changes, Extra Work."

C. Department does not allow adjustment to the Contract unless the Contractor has submitted the request for adjustment within the time prescribed as specified in this Section, article, "Notification of Differing Site Conditions, Changes and Extra Work."

D. Department does not allow adjustments to the Contract under this clause to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided for or excluded under any other term or condition of this Contract.

E. The Engineer may suspend work because of weather. The Contractor shall <u>not</u> be compensated for weather delays.

1.8 NOTIFICATION OF DIFFERING SITE CONDITIONS, CHANGES, AND EXTRA WORK

A. Promptly notify the Engineer of alleged changes to the Contract due to differing site conditions, extra work, altered work beyond the scope of the Contract, or actions taken by the Department that change the Contract terms and conditions.

B. Do not perform further work or incur further contract item expense relating to the claimed change after the date the change allegedly occurred, unless directed otherwise in writing by the Engineer.

C. Immediately notify the Engineer verbally of the alleged change or extra work occasioned by differing site conditions or actions by the Department. Provide the following applicable information to the Engineer in writing within 5 calendar days of the date the change or action was noted:
- The date of occurrence and the nature and circumstances of the occurrence that constitute a change.
- Name, title, and activity of each Department representative knowledgeable of the claimed change.
- Identity of any documents and the substance of any oral communication involved in the claimed change.
- Basis for a claim of accelerated schedule performance, if applicable.
- Basis for a claim that the work is not required by the Contract, if applicable.

D. Particular elements of contract performance for which additional compensation may be sought under this article include:
- Pay item(s) that has (have) been or may be affected by the claimed change.
- Labor or materials, or both, that are added, deleted or wasted by the claimed change and what equipment is idled or required.
- Delay and disruption in the manner and sequence of performance that has been or will be caused.
- Adjustments to contract prices, delivery schedules, staging, and contract time estimated due to the claimed change.
- Estimate of the time within which the Department must respond to the notice to minimize cost, delay, or disruption of performance.

E. The failure to provide required notice under this article constitutes a waiver of any and all claims that may arise as a result of the alleged change.

F. After notifying the Engineer, and in the absence of directions received to the contrary from an authorized representative of the Department, continue diligent prosecution of the work under the Contract to the maximum extent possible under the contract provisions.

G. Within 10 calendar days after receipt of notice, the Engineer responds in writing to the Contractor to:
- Confirm that a change occurred and, when necessary, direct the method and manner of further performance, or
- Deny that a change occurred and, when necessary, direct the method and manner of further performance, or
- Advise the Contractor that information necessary for deciding to confirm or deny the change has not been submitted, and indicate what information is needed for further review and date by which the Contractor should submit it to the Engineer. The Engineer responds to such additional information within 10 calendar days of receipt from the Contractor.

H. Any adjustments made to the Contract do not include increased costs or time extensions for delay resulting from the Contractor's failure to provide requested additional information under requirements of this article.

1.9 FINAL CLEANUP

A. Clean the project site and all areas affected by the work of all rubbish, excess materials, temporary structures, and equipment, etc., before final inspection and acceptance.

B. Final cleanup cost is incidental to other items.

PART 4 – NOTICE TO PROCEED

UDOT shall give the Contractor in writing a notice to proceed. Once the Contractor is given the notice to proceed, the Contractor shall start work on this project.

END OF SECTION

SECTION 00727

CONTROL OF WORK

PART 1 - GENERAL

1.1 RELATED SECTIONS

A. Section 00725 – Scope of Work
B. Section 01282 – Payment
C. Section 01721 – Survey

1.2 AUTHORITY AND DUTIES OF THE ENGINEER

A. The Engineer decides all questions regarding the quality and acceptability of materials furnished, work performed, rate of work progress, interpretation of the Contract Documents, and the acceptable fulfillment of the contract.

B. The Engineer has the authority by written order to suspend the work without liability to the Department wholly or in part if the Contractor fails to:
- Correct conditions unsafe for the project personnel or the public, or
- Complete contract provisions, or
- Comply with the Engineer's orders.

C. The Engineer can suspend work wholly or partially for:
- Periods of unsuitable weather, or
- Conditions unsuitable for the prosecution of the work, or
- Any other condition or reason determined to be in the Department's interest.

D. All contractors shall cooperate with the Engineer, inspectors, and other contractors to establish on-site lines of authority for communications.

E. Changes in design or materials must be presented to the Engineer at least one week prior to proposed implementation. The Engineer will have one week to respond to the proposed changes by either approving, disapproving, requesting further information, or suggesting modifications. No work shall be performed on proposed changes without written approval from Engineer.

1.3 CONFORMITY WITH PLANS AND SPECIFICATIONS

A. Perform work and furnish materials to meet Contract requirements. Conformity with the plans/specifications will be determined by the Engineer in accordance with the construction Quality Assurance Plan.

B. When a Contract item fails to meet Contract requirements but is adequate to serve the design purpose, the Engineer decides the extent to which the work will be accepted and remain in place. The Engineer documents the basis of acceptance by change order.

C. Contractor shall remove, replace, or correct work at no cost to the Department when a Contract item does not meet specified requirements and results in work inadequate to serve the design purpose.

1.4 SITE SECURITY

A. Contractor is responsible for site security as deemed appropriate to control site access.

1.5 LIMITATION OF OPERATION

A. Contractor must comply with all City, County and or State requirements regarding hours of operation and noise restrictions.

1.6 COORDINATING PLANS, STANDARD SPECIFICATIONS, AND SPECIAL PROVISIONS

A. All supplementary documents are essential parts of the Contract and a requirement occurring in one is binding as though occurring in all. Supplementary documents are complementary and provide and describe the complete Contract.

B. If there is a discrepancy, the governing ranking is:

Dimensions:

1. Plan
2. Calculated
3. Scaled

Information:

1. Special Provisions
2. Plans
3. Specifications

C. Do not take advantage of any apparent error or omission in the Contract.

D. Notify the Engineer promptly of any omissions or errors in the Contract so that necessary corrections and interpretations can be made.

1.7 CONTRACTOR COOPERATION

A. Facilitate progress of the work, and cooperate with Department inspectors and other contractors.

B. Employ a competent superintendent experienced with the work being performed, and capable of reading and understanding the contract Documents.

C. The superintendent must be:

- Present at the project site at all times while work is being performed.
- Available to execute instructions and directions from the Engineer or authorized representatives.
- Authorized to act as agent for the Contractor on the work.

D. Supply all necessary resources to complete the Contract, regardless of the amount of work sublet.

1.8 COOPERATION WITH UTILITIES

A. Use work procedures that protect utilities or appurtenances that remain in place during construction.

B. The Contractor notifies utility companies, pipeline owners, or other utility agencies affected by the work to verify that all utility adjustments, within or adjacent to the construction limits, are made as soon as possible. Coordinate with utility companies.

C. Repair damage to utilities that results from carelessness or omission. Restore damaged facilities to the pre-existing condition at no additional cost to the Department.

1.9 COOPERATION BETWEEN CONTRACTORS

A. The Department reserves the right to contract for and perform other or additional work on or near the work covered by the Contract.

B. Contractor shall cooperate with other contractors working within the project limits. Conduct work without interrupting or inhibiting the progress or completion of work by other contractors.

C. Each contractor involved accepts all liability, financial or otherwise, in connection with the Contract.

D. Each contractor protects and saves harmless the Department from any damages or claims caused by inconvenience, delay, or less from the presence and work of other contractors working within the same project limits.

1.10 CONSTRUCTION SURVEY

A. Contractor shall perform the Construction Surveying necessary to properly control the entire work per Section 01721 "Survey."

B. Contractor shall verify all elevation bench marks prior to beginning the work.

1.11 DUTIES OF ENGINEER'S INSPECTOR

A. Inspectors are authorized to inspect all work and materials furnished.
- The Inspector is not authorized to alter or waive the contract provisions, to issue instructions contrary to the Contract, or to act as foreman for the Contractor.
- The Inspector is authorized to reject work or materials until any issue in question can be referred to and decided by the Engineer.

1.12 INSPECTION OF WORK

A. Provide information, assistance, and safe access to the Engineer for all parts of the work to obtain a complete and detailed inspection.

B. Remove and replace work performed or materials used without supervision or inspection by Engineer/Inspector at Contractor expense, if ordered. **Exception:** If the Engineer/Inspector fails to inspect the work after receiving written notice 24 hours in advance of beginning work.

C. Remove and uncover portions of finished work, as directed. Once inspected, restore work to Contract requirements.
- If the uncovered work is found acceptable, the Department pays for the additional cost to uncover, remove, and replace or make good the parts removed as extra work.
- If the work is found unacceptable, the Department does not pay for additional costs to uncover, remove, and replace the covering, or make good the parts removed.

1.13 REMOVAL OF UNACCEPTABLE AND UNAUTHORIZED WORK

A. Remove and replace any unacceptable work before final acceptance.
- Work is considered unacceptable if it fails to meet the Contract requirements.

B. Work performed contrary to Engineer's instructions, work beyond plan limits, or extra work performed without the Engineer's permission:
- Is excluded from pay consideration.
- May be ordered removed, restored, or replaced by others at the Contractor's expense.

1.14 PROJECT ACCEPTANCE - FINAL

A. The Engineer conducts an inspection upon receiving notice from the Contractor or project completion. If the Contract is found to be satisfactorily completed, the inspection constitutes the final inspection

and the Engineer notifies the Contractor in writing the date the contract was inspected and accepted.

B. Immediately comply with and execute instructions given by the Engineer if the inspection discloses any unsatisfactory work.

C. Upon correction of the work, the Engineer conducts another inspection that constitutes the final inspection.

D. If the work has been satisfactorily completed, the Engineer notifies the Contractor in writing of the date of final inspection and acceptance.

1.15 PROCEDURES FOR RESOLUTION OF DISPUTES

A. Notify Department verbally and in writing of the dispute under Section 00725, article, "Notification of Differing Site Conditions, Changes and Extra Work," before beginning or continuing the affected work, if additional compensation is considered due for work or material not covered in the Contract.

B. The Engineer responds as described under Section 00725, article, "Notification of Differing Site Conditions, Changes and Extra Work," following notification, indicates whether or not a change has occurred, and provides further information concerning the method and manner of further performance of the work.

C. Provide cooperation and information to the Engineer during the period of notification review and evaluation.

D. Department does not grant additional compensation if verbal and or written notification is not given, or if the Engineer is not given proper facilities for keeping strict account of actual costs.
- Department does not construe notice by the Contractor, and the Engineer's accounting of costs as substantiating the validity of the claim.
- Department equitably adjusts the Contract if the dispute is found to have merit.

1.16 PROCEDURES FOR RESOLUTION OF CLAIMS

A. Disputes that are not resolved are escalated to the claims procedure.
- Provide written notification of the intent to make a claim under Section 00725, article, "Notification of Differing Site Conditions, Changes and Extra Work."
- Submit the formal claim in writing and with sufficient detail to enable the Engineer to ascertain the basis and amount of the claim.

B. As a minimum, include the following information with each claim submitted:
- A detailed factual statement of the claim for additional compensation and time, providing all necessary dates, locations, and items of work affected by the claim.
- The date actions resulting in the claim occurred or conditions resulting in the claim became evident.
- The name, title, and activity of each Department employee knowledgeable about facts that gave rise to the claim.
- The name, title, and activity of each Contractor employee knowledgeable about facts that gave rise to the claim.
- The specific provisions of the Contract that support the claim and a statement of the reasons why such provisions support the claim.
- All detailed facts which support positions related to a decision that the Contract leaves to the Engineer's discretion or provides that the Engineer's decision is final.
- Identity of pertinent documents, and the substance of any material verbal communications relating to the claim.
- A statement whether the additional compensation or extension of time is based on alleged breach of Contract.

- Copies of any identified documents, other than Department documents and documents previously furnished to the Department that support the claim (manuals that are standard to the industry may be included by reference).
- Request for an extension of time shall include the following:
  - The specific days for which a time extension is requested.
  - The specific reasons a time extension should be granted.
  - The specific provisions under which a time extension is requested.
- The exact amount of compensation requested and a breakdown of the cost into the following categories:
  - Direct labor.
  - Direct materials.
  - Direct equipment. Do not exceed actual cost on rates claimed for each piece of equipment.
  - Job overhead.
  - Overhead (general and administrative).
  - Subcontractor's claims (in the same level of detail as specified in Contract documents is required for any subcontractor's claims).

- Certification: Submit a statement to the Engineer containing the following language:

Under the penalty of law for perjury or falsification, the undersigned,

_____	_____	_____
Name	Title	Company

hereby certifies that the claim for extra compensation and time, if any, made herein for work on this Contract is a true statement of the actual costs incurred and time sought, and is fully documented and supported under the Contract between the parties.

Dated_____/s/_____
Subscribed and sworn before me this _____day of_____
Notary Public_____
My Commission Expires_____

C. Failure to submit information and details as described in this Section for any claim constitutes a waiver of the claims.

1.17 RECORD KEEPING FOR RESOLUTION OF CLAIMS

A. Maintain full and complete records of all costs and additional time incurred for any alleged claim.

B. Permit the Engineer access to those records and any other records as required to determine the facts or contentions involved in the claim.

C. Retain all records for a period of not less than three years after final acceptance.

1.18 AUDITING OF CLAIMS

A. All claims filed against the Department are subject to audit at any time following the filing of the claim.

B. Employees of the Department or an auditor under contract with the Department may conduct the audit. The audit may begin at any time during the life of the Contract, or 20 calendar days after notice

is provided to the Contractor, the subcontractors, or the Contractor's agents if more than 60 calendar days after the final acceptance date of the Contract have elapsed.

C. Provide adequate facilities acceptable to the Engineer for the audit during normal business hours. Cooperate with the auditors.

D. Failure of the Contractor, subcontractors, or agents to maintain and retain sufficient records to allow the auditors to verify all or a portion of the claim or to permit the auditor access to the books and records of the Contractor, subcontractors, or agents constitutes a waiver of the claim and bars any recovery.

E. As a minimum, make the following documents available to auditors:

- Daily time sheets and supervisor's daily reports
- Union agreements
- Insurance, welfare, and benefits records
- Payroll registers
- Earnings records
- Payroll tax forms
- Material invoices and requisitions
- Material cost distribution work sheet
- Equipment records (list of company equipment, rates, etc.)
- Vendors', rental agencies', subcontractors', and agents' invoices
- Subcontractors' and agents' payment certificates.
- Canceled checks (payroll and vendors).
- Job cost report.
- Job payroll ledger.
- General ledger.
- Cash disbursements journal.
- All documents that relate to each and every claim together with all documents that support the amount of damages as to each claim.
- Work sheets used to prepare the claim establishing the cost components for items of the claim including but not limited to labor, benefits and insurance, materials, equipment, subcontractors, all documents that establish the time periods, individuals involved, the hours for the individuals, and the rates for the individuals.

F. Full compliance with the provisions of this article is a contractual condition precedent to the right to seek judicial relief.

1.19 HIGHER LEVEL REVIEW FOR RESOLUTION OF CLAIMS

A. Submit all claims for higher level review to the Engineer in writing within 10 calendar days of the Engineer's denial of a claim.

B. Failure to submit a request within this 10-day time frame is considered acceptance of the Engineer's denial action.

1.20 CLAIMS BOARD OF REVIEW

A. Pursue administrative resolution of any claim with the Engineer or the designee of the Engineer.

B. If no agreement is reached, at the Contractor's written request to the Engineer, the Engineer for Construction and Materials schedules a hearing before a Department "Claims Board of Review" when deemed to be in the best interest of both the Contractor and the Department.

C. The Board makes recommendations and outlines their reasoning to the UDOT Deputy Director within 30 calendar days after the claim hearing.

D. The UDOT Deputy Director makes offer of settlement within 45 calendar days after the claim hearing.

E. The decision of the UDOT Deputy Director is administratively final.

END OF SECTION

SECTION 01280

MEASUREMENT

PART 1 - GENERAL

1.1 GENERAL MEASUREMENT OF QUANTITIES

A. All work completed under the Contract is measured in U. S. Standard measure.

B. The methods of measurement and computations for determining quantities of material furnished and of work performed under the Contract are methods generally recognized as conforming to good engineering practice.

1.2 VOLUME DETERMINATION

A. Contractor will be paid for the project based on volumes moved and placed. Those volumes will be calculated for payment as follows:

B. Computing volumes of waste and overburden (existing waste-cell cover material) excavated: Volumes moved and placed will be calculated using a pre- and post-work survey using average end area method, or computer generated Digital Terrain Model (DTM) method, unless the Engineer and Contractor agree in writing to an alternate method. The surveys will be performed by the Department (Section 01721). Waste volumes will be measured in place.

C. Computing Volume of Final Cover Material: The as-placed volume of the cover will be calculated from the area (square yards), determined by the post-work survey, and specified layer thickness as shown on Figure 6.

1.3 OTHER MEASUREMENTS

A. Standard manufactured items (fence, wire, plates, rolled shapes, pipe conduit, etc.), are identified by gauge, unit, weight, section dimensions, etc.
- Identification will be nominal weights or dimensions.
- Use industry manufacturing tolerances, unless more stringently controlled by specifications.

B. Items measured by the foot, (pipe culverts, guardrail, underdrains, etc.): measure parallel with the base or foundations upon which structures are placed

END OF SECTION

SECTION 01282

PAYMENT

PART 1 GENERAL

1.1 RELATED SECTIONS

A. Section 00725 - Scope of Work.
B. Section 00727 - Control of Work.
D. Section 01280 - Measurement.

1.2 SCOPE OF PAYMENT

A. Department compensates Contractor for work performed based on a Fixed Unit Price: Waste excavation and final cover will be paid on a fixed unit price basis as bid in cost per cubic yard (for waste excavation and placement) and cost per square yard (for final cover). Volumes of these items will be determined per Section 01280.

B. Lump sum: Complete payment for the work described in the Contract when used as an item of payment.

C. Department will not pay Contractor for:
- Work that is in excess of that contained in the Contract.
- Removal and replacement of defective work.
- Loss of anticipated profits.

D. Neither partial payment nor release of retainage relieves the Contractor of the obligation to correct all defective work or materials.

1.3 ALTERED QUANTITIES

A. When the accepted quantities of work vary from the estimated quantities in the Contract, the Department pays the original contract unit prices for the accepted quantities of work done.
- Department does not allow for any increased expenses, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor resulting either directly from such alterations or indirectly from unbalanced allocation among the contract items of overhead expense and subsequent loss of expected reimbursement or from any other cause.

1.4 DIFFERING SITE CONDITIONS, CHANGES, EXTRA WORK

A. Department pays for differing site conditions, changes, and extra work performed under Section 00725 at unit price as stipulated in the order authorizing the work.

1.5 PROGRESS PAYMENTS

A. Department makes progress payments at least once each month as the work is progressing.

B. Payments are based on estimates prepared by the Engineer of the value of the work performed and materials in place under the Contract and for materials delivered.

C. From the total of the payable amounts, the Department deducts and retains 5 percent until after the entire Contract has been completed in an acceptable manner. The Department certifies the remainder for payment, less all previous payments.

1.6 ACCEPTANCE AND FINAL PAYMENT

A. When the project has been accepted as provided in Section 00727, article, "Project Acceptance - Final," the Engineer prepares the final estimate of work performed based on the quantities provided by the surveyor.
   - If the Contractor approves the final estimate or does not object to the quantities within 30 calendar days of receiving the final estimate, the Department processes the estimate for final payment.
   - After approval of the final estimate by the Contractor, Department pays for the entire sum due after deducting all previous payments and all amounts to be retained or deducted under the provisions of the Contract.

B. If additional payment is due from the Department, file with the Department a full, complete, and itemized written statement justifying the adjustment within 30 calendar days after the final estimate is submitted for approval.
   - All disputes not itemized in said statement are waived by the Contractor.
   - Submission of disputes by the Contractor will not be reason for withholding full payment of the total value of work shown on the Engineer's final estimate.
   - The Department evaluates the dispute. If it is determined that additional payment is due, the final estimate is revised accordingly, under the terms of the Contract. If not, the estimate as submitted is final.

C. All prior partial estimates and payments are subject to correction in the final estimate and payment.

D. The Department has the final estimate complete and to the Contractor within 45 calendar days of when the Contractor meets substantial completion of the project and has supplied the Engineer with all project certifications.

END OF SECTION

SECTION 01560

ENVIRONMENTAL CONTROLS

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. As required by the State of Utah, Division of Air Quality, the Contractor shall prepare and submit a Fugitive Dust Plan to UDAQ in accordance with Utah Administrative Code (UAC) R307-309 prior to commencement of work. Contractor shall also submit to the Department the Fugitive Dust Plan for approval.

B. The Contractor shall provide dust control measures as required to abate fugitive dust. Dust control measures shall be implemented during excavation, transport, processing, and placement of all soil materials.

C. As required by the State of Utah, Division of Water Quality, the Contractor shall obtain and comply with the Utah Pollution Discharge Elimination System (UPDES) Stormwater Permit for construction activities. A Stormwater Pollution Prevention Plan (SWPPP) is required to identify potential sources of pollution, including sediments, and to provide sediment and erosion controls and stormwater management practices that will prevent pollution. Contractor shall submit to the Department the SWPPP for approval prior to issuing a notice of intent for the UPDES Permit.

D. The Contractor shall provide wind-blown litter controls as required to minimize the transportation of litter off of the site due to waste transportation, placement, and compaction.

E. Contractor shall provide a Odor Control Plan <u>if required</u>. Engineer will determine within the first 2 weeks of construction if Odor Control Plan is required and will request in writing that Contractor develop this plan. Work will be considered a significant change and will require a change order.

F. Contractor shall prepare a Health and Safety Plan for Contractor's workers that considers the nature of the work being performed and adequately addresses worker health and safety.

G. Contractor must preserve existing on-site monitor wells. The wells must be made visible to all heavy equipment to reduce the potential for damage. Contractor is responsible for the restoration of said wells if they are damaged.

PART 2 - PRODUCTS

2.1 DUST CONTROL

A. The Contractor shall provide a water truck for the application of water for dust control and shall also be responsible for the procurement of clean water.

B. Contractor shall prevent tracking of silt, sediment, and gravel onto paved surfaces outside the project site by installing mitigation devices where necessary. Maintain the devices to effectively remove silt, sediment, and gravel from equipment prior to leaving work site.

2.2 FENCE FABRIC

A. Contractor shall supply and install fence fabric around active work areas and/or exposed waste to limit windblown debris. All possible measures must be taken to avoid waste being blown or otherwise transported off the project site. Fence fabric shall be provided as follows:

- Polyethylene, high-density, orange, UV stabilized.

- Width: 5 ft minimum.
- Tensile Strength: capable of maintaining an upright position through construction.
- Fabric pattern: sufficient to create a durable visual barrier.
- Color: orange.

2.3 POSTS

A. Painted or galvanized metal "T" post, 7 ft long.
B. Anchor plates optional.

2.4 ODOR CONTROL MATERIAL

A. Odor control material to be determined at time of development of Odor Control Plan (if required). Contractor to propose odor control material to Engineer who shall have 2 days to approve/disapprove.

2.5 DOCUMENTATION

A. Contractor shall provide documentation of compliance with environmental controls as stipulated by UDAQ and UDWQ permits.

PART 3 - EXECUTION

3.1 DUST CONTROL

A. Dry soils that produce dust upon working shall be wetted once prior to starting work each day, if needed, and thereafter only upon noticing visible fugitive dust emissions. Water shall be applied in a manner as to avoid puddling and runoff. The Contractor shall procure and apply water for dust abatement.

3.2 LITTER CONTROL

A. Location: The paper-catch fence shall be placed around any active excavation and waste placement areas. The fence shall be placed within 50 feet of the work area and shall be placed around all sides of the work area.

B. Installation: The fence shall have T-posts driven a minimum of 18 inches into the ground surface at a maximum spacing of 12 feet. The fence shall be supported by attaching the fence fabric to the posts by stretching the fabric taut and fastening to the posts with tie wires. The ties shall be tight and have a minimum of two full turns; the ends of the ties shall be turned in to prevent personal injury. Fence fabric shall be installed on the windward-facing side of the posts. Fabric shall be kept within three inches of the ground surface by removing high points and filling depressions as needed.

C. Repair and Removal:
- Contractor shall maintain the fence during construction, and
- Remove the fence and posts upon completion of construction.

3.3 PREPARATION of SWPPP

A. Contractor shall develop and follow the Storm Water Pollution Prevention Plan (SWPPP).
- Address in the SWPPP all disturbed areas on a project including staging areas, haul roads, borrow sites, stockpiles, and disposal areas.
- Create and submit a plan to the Engineer for approval at least one week prior to starting work.
- Obtain written approval from the Engineer to change the SWPPP.
- Do not start earth disturbing work until SWPPP is approved, and appropriate temporary erosion

and sediment control measures are in place.

3.4 EROSION CONTROL INSTALLATION

A. As provided in the SWPPP, provide or construct measures such as check dams, silt fence, slope drams, drop-in inlet barriers, sediment traps, and other erosion control devices or methods to prevent erosion and sedimentation during construction and/or shutdown periods.
- Control surface drainage from cut, fill, borrow, and waste disposal areas, to prevent erosion and sedimentation.
- Remove sediment when it reaches a depth that interferes with the operation of an erosion control structure.
- Maintain temporary sediment control devices until all disturbed areas draining to it are stabilized.

B. Inspect earthwork during construction to detect any evidence of the start of erosion. Pro-actively apply corrective measures in a timely manner as required.

C. Inspect all sediment retention structures after each storm, remove deposited silt, and make any necessary repairs..

3.5 ODOR CONTROL

B. Odor control methods to be determined at time of development of Odor Control Plan (if required). Contractor to propose odor control application methods and frequency to Engineer who shall have 2 days to approve/disapprove.

END OF SECTION

SECTION 01721

SURVEY

PART 1 - GENERAL

1.1 RELATED SECTIONS

A. Section 01280 – Measurement
B. Section 01282 – Payment.

1.2 RESPONSIBILITIES

A. Contractor will be responsible for construction survey(s) to be performed in order to construct to the dimensions and grades shown in the plans. The Department requires that all surveys be performed by a Professional Engineer or Professional Land Surveyor registered in the State of Utah.

B. The Department will perform the pre- and post-work surveys used to calculate the volumes moved and placed that will be used to calculate payment.

PART 2 - PRODUCTS

2.1 EQUIPMENT

A. Contractor shall furnish survey instruments and supporting equipment capable of achieving the specified tolerances. Calibrate survey equipment for accuracy prior to beginning survey work and as required.

PART 3 - EXECUTION

3.1 PREPARATION

A. The Department will establish construction survey benchmarks to be used by the Contractor as necessary to control layout and complete the work.

B. The Contractor shall calculate all grades, elevations, offsets and alignment data necessary for staking and/or setting items of work. Obtain approval from the Engineer for alternate methods of establishing grade control with wire lines, computer or laser controlled grading or other suitable methods.

3.2 DIRECTED SURVEY

A. Contractor shall conduct directed surveying if requested by the Engineer.
- Includes work needed for changes and extra work. Provide all labor, materials, and equipment including global positioning satellite equipment.
- Obtain prior written authorization from the Engineer documenting the affected work and requirements before performing work under these items.

3.3 COMPUTATIONS AND PLOTS

A. When work is modified by a change order, use cross-sections to calculate volume measurements.
- May develop cross sections from digital terrain models (preferred method) provided that:
  - The ground survey locations do not exceed 100 ft in any direction

- Major breaks in terrain are also included.
- The horizontal and vertical control for the project is used
- The DTM is verified accurate to require tolerances by spot checking throughout the length of the project.

- Superimpose final cross sections with original cross sections and calculate final quantities using the average end area method.
- Develop cross-sections from field measurements.
  - Take cross section measurements both before and after excavation and prior to backfill.
  - When the centerline curve radius is less than or equal to 500 ft, take cross sections at a maximum centerline spacing of 25 ft.
  - When the centerline curve radius is greater than 500 ft, take cross sections at a maximum spacing of 50 ft.
  - Take additional cross sections at breaks in terrain and at changes in typical sections.
  - For each cross section, measure and record points at breaks in terrain, but at least every 25 ft unless otherwise approved by the Engineer.
  - Measure and record points to at least the anticipated slopes and reference locations.
  - Reduce all cross section distances to horizontal distances from centerline.
  - Take cross sections at right angles to tangents and normal to curves,
  - Include in cross sections all grades, locations, and existing ground line profiles.

B. Engineer may approve alternate methods of calculating quantities.

3.4 CONTROL POINT AND SURVEY TOLERANCES. Contractor shall ensure the following:

A. Relocate initial horizontal and vertical control points (established by Department) in conflict with construction to areas that will not be disturbed by construction operations. Furnish the coordinates and elevations for the relocated points before the initial points are disturbed.

B. Protect bench marks from construction activities. Position all bench marks to allow a level rod to stand vertically and squarely on the mark. Reference bench marks to centerline and horizontal measurements.

C. Survey and establish control within the following tolerances:

Description	Horizontal	Vertical
	Decimals of a foot	
Control Points	±0.01	±0.01
Cross sections and slope stakes	±0.10	±0.10
Culverts and Ditches	±0.10	±0.10
Environmental Control Limits	±1.00	--

Coordinate the survey tolerances of any items not listed above with the Engineer.

3.5 CLEANUP

A. Contractor shall remove and dispose of all flagging, lath, stakes and other staking material after the project is complete

END OF SECTION

SECTION 02025

PASSIVE METHANE VENT

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The Contractor shall be responsible for all materials, equipment, and labor required to furnish and install eight (8) passive methane vent wells in the final cover of the waste disposal area, and three (3) methane monitoring wells as shown on the plans in Figures 4 and 7.

PART 2 - PRODUCTS

2.1 PVC SCREEN AND LOCKING CAPS

A. Slotted PVC pipe used for methane vents shall be 4" schedule 80 with 0.04" screen.
B. Slotted PVC pipe used for methane monitor wells shall be 2" schedule 80 with 0.04 " screen. Two-inch compression locking caps shall be shall be used to cap the methane monitor wells.

2.2 GALVANIZED PIPE

A. Galvanized pipe used for the methane vent shall be 6" diameter schedule 40 pipe. No pipe vent stack will be necessary for the monitor wells.

2.3 SAND PACK

A. Sand shall be placed in the methane vent/well boring annulus as shown in the plans. The material shall be 8-12 mesh silica sand.

2.4 BENTONITE SEAL

A. The bentonite seal shall be constructed of bentonite chips, such as Hole Plug©, that are hydrated with clean water.

2.5 MANHOLE COVER

A. The monitor wells shall be completed at ground surface with a flush-mounted 10" steel manhole cover set in concrete.

PART 3 - EXECUTION

3.1 INSTALLATION

A. The PVC screen component of the methane vent wells will be installed prior to installation of the final cover in the locations presented on Figure 4 of the plans. The methane monitor wells may be installed at any time, however, if construction activities damage the wells they will be replaced at the contractor's expense. The PVC screen for the vent and monitor wells shall be installed at least 12" into the native soil underlying the disposal cell and shall extend to the top of the final cover (see Figure 6). The approximate vent and monitor well depths shall be 70 feet below grade.

B. Sand pack material shall be placed to the height shown on Figure 6 of the plans.

C. The bentonite chips shall be placed in the excavation to the required thickness, as shown on Figure 6. The chips shall be hydrated with a minimum of 2 gallons of clean water. The chips shall be hydrated

again 4 hours after the initial addition of water to ensure that there is a tight seal.

D. For the methane vent wells, the galvanized pipe riser shall be slid over the PVC screen and encased in concrete as shown on Figure 6 of the plans. The concrete shall form an air-tight seal between the PVC screen and the galvanized pipe. A one-half inch threaded sampling port shall be installed in the pipe approximately 12" above ground surface. The outside of the galvanized pipe below the top of concrete shall be coated with a corrosion protective coating.

E. For the methane monitor wells, the PVC cap will be placed on the well approximately 6 inches below ground surface. The well will be completed flush-mounted at ground surface with a ten-inch diameter steel manhole cover. The manhole cover will be encased in a three-foot by three-foot concrete pad.

END OF SECTION

SECTION 02100

EXCAVATION AND PLACEMENT OF WASTE

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The Contractor shall be responsible to provide all material, equipment, and labor required to excavate the overburden material (soil now covering the waste) and municipal solid waste and construction debris from the former landfill areas identified on the plans as well as smaller, unmapped waste piles on the subject property. The waste and overburden shall be placed in a single landfill cell located in the southeast corner of the subject site. After placement, the waste shall be capped in accordance with the plans and these specifications. Project completion includes installation of methane vent wells and permanent stormwater control structures.

1.2 SITE CONDITIONS

A. The overburden and native soils at the site can range from silty clay to gravel. The site was a gravel pit since the mid-1950s and the native soils are primarily coarse-grained. Groundwater is about 170 feet below ground surface and is not expected to be encountered during excavation.

1.3 RELATED WORK AND REFERENCES

A. Contractor shall comply with all pertinent OSHA Regulations.

PART 2 - PRODUCTS

2.1 OVERBURDEN MATERIAL

A. Native soil used as interim cover (overburden) material that currently covers the existing waste piles generally consists of 0-10 feet of materials that range from fine-grained (silt/clay) to coarse-grained (sand/gravel). The surface is generally heavily vegetated with grass.

B. The estimated volume of overburden (in cubic yards) for each of the municipal waste cells is presented in Figure 3. There is not a significant volume of overburden on the construction-demolition waste cells.

2.2 WASTE

A. Waste consists of municipal solid waste and construction debris materials that was deposited at the site during the 1960s and 1970s and latter covered with native soils. Any overburden that includes visible waste will be considered waste material and will be treated similarly. Estimated waste volumes are listed on Figure 3 of the Plans and Specifications. Contractor should recognize these volumes are estimated and could change. Payment for the final volumes moved and placed during the project will be determined as detailed in Section 01282 – Payment.

PART 3 - EXECUTION

3.1 OVERBURDEN AND WASTE EXCAVATION

A. The overburden and waste material shall be excavated generally to the depths shown on the plans (see waste depth estimates on Figure 3). Because the total depth of the waste is not definite, the contractor

shall visually inspect the excavation of the waste to ensure that clean underlying soil is not excavated with the waste material. Any underlying soil that is stained or obviously impacted shall be excavated along with the waste.

B. Contractor shall remove all waste piles mapped on Figure 3 as well as any other smaller, visible waste piles on the subject property. Smaller, unmapped waste piles do exist on site and shall require transfer to the final waste cell; however, the total volume of this waste is not anticipated to exceed 100 cubic yards.

C. After all visible waste has been excavated the underlying soils shall be sampled by the Inspector as outlined in the Construction Quality Assurance Plan (CQAP) and analyzed for total RCRA metals. Provide Inspector at least 24 hours notice that area is ready to sample.

D. No work shall be performed in this area until results of the tests are received. If the samples come back above cleanup levels, the Contractor shall remove at least 12 inches of additional material and the Inspector shall resample the area.

3.3 WASTE TRANSPORTATION

A. Waste shall be transported in equipment supplied by the contractor. The trucks shall be loaded in a manner to ensure that waste material will not fall out as it is being transported and to reduce potential for windblown litter.

3.4 WASTE PLACEMENT

A. Waste shall not be placed in standing water. The waste shall be placed and compacted in lifts with a maximum loose thickness of 2 feet. Waste may not be placed over greater than six inches of compacted snow. If Engineer determines snow depth is greater than six inches, he may require work stoppage and/or removal of snow.

B. The waste disposal area shall be kept at a relatively constant grade without any abrupt changes in slope. Care shall be exercised to ensure that the waste slopes toward the edge of the disposal area and that there is no ponding of water. The waste shall be placed to the general dimensions and grades presented on Figure 4 of the plans.

3.5 WASTE COMPACTION

A. The waste shall be compacted with a sheep's foot waste compactor (e.g. minimum CAT 816 or equivalent). The waste shall be placed in lifts not to exceed 2 feet and each waste lift shall be compacted with a minimum of 3 passes.

B. Any areas that do not compact sufficiently and are still spongy after 3 passes of the compactor shall be recompacted until the waste material is sufficiently unyielding as determined by the on-site Inspector.

3.6 SAFETY

A. All excavation shall be done in accordance with OSHA regulations and according to local standards and accepted safe practices.

END OF SECTION

SECTION 02300

FINAL COVER

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The Contractor shall be responsible for all materials, equipment, and labor required to furnish and install the final cover for the waste disposal area as shown on the plans.

B. After the waste has been relocated to the disposal cell, a final cover shall be constructed using native and/or imported materials. The final cover shall include (from the bottom up) the following:
- 12-inch subbase constructed using on-site select fill
- Geosynthetic Clay Liner (discussed in Section 02340)
- 18-inch protective cover constructed using on-site select fill

1.2 RELATED WORK

A. Section 02025 – Passive Methane Vent

B. Section 02100 – Excavation and Placement of Waste

C. Section 02340 – Geosynthetic Clay Liner

PART 2 - PRODUCTS

2.1 SUBBASE

A. The landfill cap subbase shall be constructed using on-site select fill material (shown on Figure 3) generally consisting of silty clay soil. The subbase material must be free of debris, frozen blocks, angular or sharp rocks larger than 2 inches in largest dimension as well as any other deleterious materials. Contractor should anticipate screening the select fill to meet this specification.

2.2 GEOSYNTHETIC CLAY LINER

A. See Section 02340.

2.3 PROTECTIVE COVER

A. The landfill protective cover shall be constructed using on-site select fill material (stockpile shown on Figure 3) generally consisting of silty clay soil. The material must be free of debris, frozen blocks, angular or sharp rocks larger than 2 inches in largest dimension as well as any other deleterious materials. Contractor should anticipate screening the select fill to meet this specification.

PART 3 – EXECUTION

3.1 SUBBASE

A. At least 12 inches of subbase material shall be placed over relocated waste material after it has been graded to final contours. The subbase material must not be placed on greater than three inches of compacted snow.

B. The subbase material shall be placed in one lift and shall be lightly compacted with at least one pass of a smooth drum compactor. Compaction of the subbase material shall be to the extent that no rutting is caused by installation equipment or vehicles.

C. Prior to installation of the GCL (see Section 02340), the subbase material should be final graded to fill all major voids or cracks to provide a smooth surface for the installation of the liner. The surfaces to be lined should be smooth and free of debris, roots and angular or sharp rocks larger than 2 inches in the largest dimension. Minor variations in the subgrade surface are tolerable, although no sharp irregularities should exist. The surface of the subbase layer shall have a relatively uniform slope as this layer is the base for the rest of the final cover.

3.2 GEOSYNTHETIC CLAY LINER

A. See Section 02340.

3.3 PROTECTIVE COVER

A. The protective cover shall be placed over the GCL as soon as possible after GCL installation, but no greater than 48 hours after laying GCL. At no time shall contractor allow any portion of the placed GCL to be exposed to measurable rain or snow prior to placing protective cover. It may be necessary for contractor to coordinate with the GCL installer so that no more GCL is installed than can be covered within the specified time period.

B. Protective cover shall be composed of on-site select fill material free of sharp-edged stones larger than 2 inches in largest dimension. The cover shall be spread by low ground pressure equipment with a contact pressure of no more than 5 psi.

C. A minimum cover thickness of 12 inches should be kept between heavy equipment and the GCL at all times. No vehicles shall drive on the GCL until proper cover has been placed to the specified depth.

D. Care should be taken to push materials upslope wherever possible and to avoid pinching or shifting the GCL by making sharp turns or sudden stops.

E. Final thickness of the protective cover shall be 18 inches.

3.4 FINAL SLOPE

A. Verify with survey that final cover meets minimum slope of 2% on the top deck and is not steeper than 3:1 (horizontal:vertical) on side slopes (see Figure 4).

END OF SECTION

SECTION 02340

GEOSYNTHETIC CLAY LINER

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The contractor shall be responsible to provide all material, equipment, and labor required to install the Geosynthetic Clay Liner (GCL) as part of the final cover construction.

1.2 RELATED WORK

A. Section 02025 – Passive Gas Vent
B. Section 02300 – Final Cover

PART 2 - PRODUCTS

2.1 GEOSYNTHETIC CLAY LINER

A. A GCL shall be placed over the relocated waste material and subbase. The GCL shall be Bentomat® ST or equivalent. The GCL shall meet the following minimum requirements.

GEOSYNTHETIC CLAY LINER SPECIFICATIONS

Specification	Test	Required Values
Bentonite Mass/Area	ASTM D 5993	0.75 lb/ft^2
GCL Grab Strength	ASTM D 4632	90 lbs
GCL Peel Strength	ASTM D 4362	15 lbs
GCL Index Flux	ASTM D 5887	1 x 10^{-8} m^3/m^2/sec max
GCL Permeability	ASTM D 5887	5 x 10^{-9} cm/sec max
GCL Hydrated Internal Shear Strength	ASTM D 5321	500 psf
Friction Angle of GCL/ Soil Interface (1)	TBD	TBD

(1) Required friction angle to be determined by Engineer using site-specific materials. Information to be provided to Contractor at least 30 days prior to installation of GCL.

PART 3 - EXECUTION

3.1 SURFACE AND SUBGRADE PREPARATION

A. Twelve inches of subbase material shall be placed over relocated waste material prior to installation of the GCL. See Section 02300 for details.

3.2 GCL HANDLING AND PLACEMENT

A. Contractor shall subcontract the GCL installation to a manufacturer's representative qualified and trained to install the GCL or shall have the manufacturer's representative on-site during all GCL placement to provide quality control oversight and final inspection.

B. Handling and placement of the GCL shall conform to manufacturers guidelines, including, but not limited to the following:

C. The GCL may not be installed in standing water or during rainy weather. The GCL may not be placed on greater than one inch of compacted snow.

D. Only as much GCL shall be deployed as can be covered at the end of the working day with soil or a temporary waterproof tarpaulin. The GCL shall not be left uncovered overnight.

E. Equipment which could damage the GCL shall not be allowed to travel directly on it.

F. Typical equipment used for deployment may range from an extendible boom forklift or a front-end loader or backhoe with the GCL roll suspended using a spreader bar and a core pipe through the core in order to facilitate deployment and prevent damage to the panel edges caused by the suspending chains or straps.

G. Flat-bladed vise-type grips may be used by laborers for handling. The GCL may be cut with a sharp utility knife, scissors, or with a battery-powered rotating blade cutter. Panels of GCL should be installed with the nonwoven surface facing down in order to increase friction against the subgrade.

H. All seams should run parallel to the direction of the slope. Deployment should proceed from the highest elevation to the lowest to facilitate drainage in the event of precipitation. GCL rolls may not be released on the slope and allowed to unroll freely by gravity.

3.3 SEAMING PROCEDURES

A. A minimum of a 6-inch to 9-inch overlap should exist at all seam locations. A lap line as well as a match line have been printed on the specified GCL panel edges at 6 and 9 inches respectively, to ensure the proper overlap is achieved.

B. The GCL panels should be adjusted to smooth out any wrinkles or creases between adjacent panels, leaving a proper seam where the overlapping panel covers the lapline of the underlying panel, but leaves the matchline exposed.

C. Any native soil and debris should be removed from the contacting GCL surfaces to ensure seam integrity. The overlapping panel edge should be pulled back and granular sodium bentonite shall be poured continuously along all seams and lap areas from the panel edge to the 6-inch lapline, at a minimum application rate of 0.25 pound per lineal foot.

3.4 PENETRATION SEALING

A. For sealing around penetrations such as passive gas vents, a small notch should be made around the circumference of the pipe, into the subbase material. Granular bentonite should then be packed around the pipe in the notch and on adjacent areas so that the pipe is encased by a pure bentonite seal as shown on Figure 6 of the Plans.

B. The GCL panel should then be placed over the penetration and slit into a "pie" configuration where the pipe is to protrude. This procedure will create a snug fit between the GCL and the pipe once the laps are trimmed.

C. More sodium bentonite should then be spread around the cut edges of the GCL against the pipe and over adjacent areas.

D. To complete the detail, a collar of GCL that extends at least 6 inches past the pipe, should be cut in a manner similar to that made on the main panel and fit around the pipe, with additional sodium bentonite applied into any gaps that may remain.

3.5 DAMAGE

A. Rips or tears may be repaired by completely exposing the affected area, removing all foreign objects or soil, and by then placing a patch over the damage, with a minimum overlap of 12 inches on all edges.

B. Granular bentonite shall be placed between the patch and the repaired material at a rate of 0.25 pound per lineal foot of edge spread in a six-inch width.

C. If damage occurs on a slope, the same basic procedure should be used. However, the edges of the patch should be fastened to the repaired liner with contact cement, epoxy, or some other construction adhesive, in addition to the bentonite-enhanced seam

3.6 AVOID GCL HYDRATION

A. Contractor shall take all necessary precautions to avoid hydrating the GCL prior to placing the protective cover. The GCL shall not be installed if weather forecasts indicate ensuing storms that would commence prior to complete placement of the protective cover.

B. At no time shall contractor allow any portion of the placed GCL to be exposed to measurable rain or snow prior to placing protective cover. It may be necessary for contractor to coordinate with the GCL installer so that no more GCL is installed than can be covered within the specified time period in order to limit the potential to saturate the GCL.

C. The GCL may not be installed on top of greater than one inch of compacted snow. If Engineer determines snow depth is greater than six inches, he may require work stoppage and/or snow removal.

3.7 PROTECTIVE COVER

A. A protective cover will be placed over the GCL. See Section 02300 for details.

END OF SECTION

SECTION 02370

EROSION CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Contractor shall be responsible to provide all material, equipment, and labor required to provide temporary erosion control for ditches and other areas where flow will likely be concentrated as per the Contractor's SWPPP.

B. Contractor shall be responsible to provide temporary erosion control for the permanent stormwater drainage structures (ditches and basin) to prevent erosion until the structures revegetate.

1.2 RELATED WORK

A. Section 02630 – Stormwater Drainage Structures

PART 2 - PRODUCTS

2.1 EROSION CONTROL BLANKET

A. Erosion control blankets shall be used for temporary erosion control on permanent stormwater control structures where required (See Detail Figure). The blanket shall be manufactured of straw or aspen reinforced with a photodegradable synthetic netting on each side, North American Green ™S150 or equivalent.

2.2 RIP RAP

A. All riprap shall be a well-graded imported granular material. The riprap shall be a durable, hard, rock suitable for use as riprap. The material shall not be shale or sandstone rock. The riprap used for the drainage ditches shall meet the following gradation:

Size	Percent Passing
6 "	100
4 "	30-70
2 "	0-20

2.3 EROSION CONTROL GEOTEXTILE

A. Furnish non-woven geotextile as specified in AASHTO M288. Geotextile shall have a minimum weight of 4 oz/square yard.

PART 3 - EXECUTION

3.1 AREAS WHERE EROSION CONTROL IS REQUIRED

A. Contractor is responsible to provide temporary erosion control and stormwater runoff control in accordance with Contractor's SWPPP.

B. An erosion control blanket shall be placed in all storm water ditches, or areas of concentrated flow, with a slope less than 10%. A blanket shall be placed in all ditches where riprap is not specified. For all slopes greater than 10%, riprap shall be placed.

3.2 RIPRAP PLACEMENT

A. Place underlying non-woven geotextile in ditches as follows: The longitudinal seams shall be parallel to the slope of the ground surface. Overlap all end seams a minimum of 6 inches, and overlap all side seams a minimum of 3 inches. Bury the top edge of the erosion blanket in a 6-inch deep and wide trench at the top of the slope, backfill with native materials,

and compact. Do not staple geotextile.

B. Place the riprap in all specified areas to a minimum depth of 9 inches. Inspect the riprapped ditch after placement of riprap and manually fix any areas where the riprap is thin or protrudes excessively above the flowline.

END OF SECTION

SECTION 02630

PERMANENT STORMWATER DRAINAGE STRUCTURES

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The contractor shall be responsible to provide all material, equipment, and labor required to excavate, backfill, construct, and install the drainage structures.

B. Drainage ditches and detention basin shall be installed to facilitate construction activities and promote drainage of the final cover.

1.2 RELATED WORK

A. Section 02370 - Erosion Control
B. Section 02930 - Revegetation

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

3.1 DRAINAGE DITCHES

A. The drainage ditches shall be constructed in the locations shown on Figure 4 of the Plans and to the dimensions shown on Figure 7 Detail C and D of the Plans. All ditches shall have a minimum slope of 1%.

B. After the ditches have been excavated, the ditch shall be lined with either an erosion control blanket or riprap as shown on the Plans and specified in Section 2370.

END OF SECTION